Functional analysis of some axonemal dynein light and intermediate chains in the ciliary movements of *Paramecium tetraurelia*

Osamu KUTOMI[1], Manabu HORI[2], Kanako INOUE[2] and Munenori NOGUCHI[1] ([1]Graduate School of Science and Engineering, University of Toyama, [2]Graduate School of Science and Engineering, Yamaguchi University)

SUMMARY

We examined the ciliary movements in *Paramecium tetraurelia*, in which the gene that encodes a particular axonemal dynein subunit was silenced using a feeding method. The observations of the ciliary movements were conducted using cortical sheets. The ciliary beat frequency of the reactivated cilia on the cortical sheets from outer dynein arm light chain (ODA LC1)-silenced cells decreased significantly. The stimulative effect of cAMP in the ciliary beat frequency also decreased. However, the ciliary waveform of the reactivated cilia was quite normal. These results support the idea that p29 is involved in the regulation of the ciliary beat frequency. The reactivated cilia on the cortical sheets from outer dynein arm intermediate chain (ODA IC1)-silenced cells exhibited a decreased beat frequency and an abnormal ciliary waveform. The abnormality of the behavior and the growth by ODA IC1-silencing might result from the abnormal ciliary movements. In contrast to ODA IC1, the ciliary movements of ODA IC2-silenced cells were normal. The reactivated cilia on the cortical sheets from inner dynein arm intermediate chain (IDA IC1)-silenced cells showed no typical ciliary reversal in the presence of Ca^{2+}, which indicates that IDA IC1 is involved in determining the direction of the effective stroke, especially in the ciliary reversal.